WHAT IS CLAIMED IS:

1. A method of treating a staphylococcal infection in a mammal in need of same, comprising administering an antimicrobial agent thereto while suppressing the formation of staphylococci mutant strains resistant to said antimicrobial agent, said method comprising simultaneously administering an amount of an anti-staphylococcal agent whose activity is mediated by cleavage of the glycine-containing cross-links of peptidoglycans of the cell wall of staphylococci (peptidoglycan active agent) and an amount of another antibiotic effective against sensitive staphylococci, wherein said antibiotic activity is mediated by cell-wall activity (cell wall active antibiotic), whereby the formation of staphylococci mutant strains resistant to said peptidoglycan active agent is suppressed, wherein said amount of peptidoglycan active agent and said amount of said cell-wall active antibiotic are each individually sufficient to be therapeutically effective against sensitive staphylococci, when co-administered.

2. The method of Claim 1, wherein said peptidoglycan active agent is lysostaphin

3. The method of Claim 1, wherein said administration is achieved through any one or more of intravenous (IV), intramuscular (IM), subcutaneous (SC), intraperitoneal (IP), intrathecal or topical administration.

4. The method of Claim 3, wherein said administration is SC, IP, intrathecal or topical.

5. The method of Claim 3, wherein said administration is either IV or IM.

6. The method of Claim 1, wherein said cell wall active antibiotic is a β-lactam or a glycopeptide.

7. The method of Claim 6, wherein said cell-wall active antibiotic is a β-lactam.

8. The method of Claim 7, wherein said β-lactam is selected from the group consisting of a penicillin, a cephalosporin and a carbapenem.

9. The method of Claim 8, wherein said β-lactam is a penicillin.

10. The method of Claim 1, wherein said staphylococcal infection is mediated by at least one *S. aureus* microorganism.

11. The method of Claim 1, wherein said staphylococcal infection is mediated by at least one coagulase-negative staphylococcal microorganism.

12. A composition effective in the treatment of staphylococcal infection in a mammal, comprising, as active agents, an anti-staphylococcal agent whose activity is mediated by cleavage of the glycine-containing cross-links of peptidoglycans of the cell wall of staphylococci (a peptidoglycan active agent) and an amount of another antibiotic effective against sensitive staphylococci wherein said antibiotic activity is mediated by cell wall activity (a cell wall active antibiotic), further comprising a pharmaceutically acceptable carrier, wherein each of said peptidoglycan active agent and cell-wall active antibiotic are individually present in amounts which are therapeutically effective in treating a sensitive staphylococcal infection.

13. The composition of Claim 12, wherein said anti-staphylococcal peptidoglycan active agent is lysostaphin.

14. The composition of Claim 12, wherein said cell-wall active antibiotic is a β-lactam or a glycopeptide.

15. The composition of Claim 14, wherein said cell-wall active antibiotic is a β-lactam.

16. The composition of Claim 15, wherein said β-lactam is selected from the group consisting of a penicillin, a cepalosporin and a carbapenem.

17. The composition of Claim 16, wherein said β-lactam is a penicillin.

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